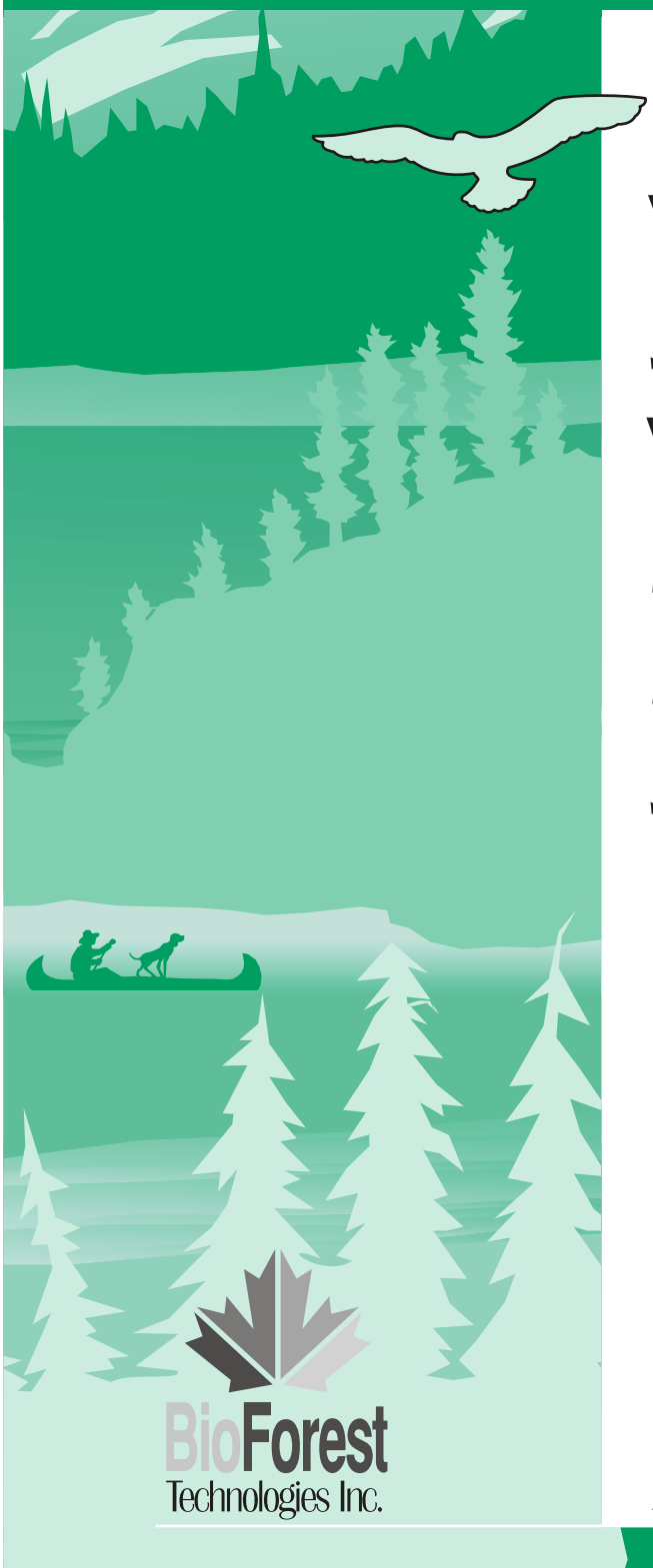
Lake Superior State Forest Sustainable Forest Management Pilot Project

REPORT 8



Workshop I Summary: Values and Indicators of the Lake Superior State Forest

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1. Introduction

A workshop (Workshop I) was held with Lake Superior State Forest (LSSF) internal and external stakeholders (Appendix 4) on June 25 and 26, 1998 in Newberry, Michigan. The purpose of Workshop I was to provide LSSF stakeholders with an overview of the Sustainable Forest Management Project and to gather LSSF stakeholder input on key components of a sustainable forest management plan for the LSSF, specifically on values and indicators and public participation. This report summarizes the results of the values and indicators portion of Workshop I. A separate report is being prepared on the public participation portion. In section 3 of this report, we present a suggested list of indicators for the values developed during the workshop. This list was derived directly from the list developed at the workshop, with some modifications.

2. What do you value in the Lake Superior State Forest?

Workshop participants were divided into seven groups and each group was asked to make a list of what it valued in the LSSF. All together, participants came up with 268 values for the LSSF. All the values, listed by group, can be found in Appendix 1. A spreadsheet containing all of the values and indicators is also available from the LSSF SFM Project. Together the seven groups combined similar values and created the 12 broad values that are listed below:

1. Ownership Patterns
2. Institutional Processes
3. Recreation
4. Multiple Use
5. Spiritual
6. Social/Cultural
7. Diversity of Jobs
8. Biodiversity
9. Healthy Forests
10. Global Cycles
11. Water Resources
12. Unique Features

These broad values are similar to values that have been identified by other groups, such as the Canadian Standards Association (CSA) and Great

Lakes Forest Alliance (GLFA). One difference between the LSSF list and the CSA and GLFA lists is the emphasis the LSSF stakeholders have placed on recreation and the multiple uses of the forest. Sometimes it is difficult to discern the more specific values within each broad value. The ideas captured in each broad value become clearer when the broad values are broken down into sub-values and assigned indicators, as was done at the workshop. These tasks are addressed in the following sections.

3. Indicators - Mining for nuggets

Each group was assigned one, two or three of the broad values and asked to formulate indicators for those values. The values assigned to each group are listed below.

Group	Value
1	Ownership Patterns
	Institutional Processes
2	Recreation
3	Multiple Use
4	Spiritual
	Social/Cultural
5	Diversity of Jobs
6	Biodiversity
	Healthy Forests
	Global Cycles
7	Water Resources
	Unique Features

The indicators that the groups developed are outlined in the next section.

4. Is it a good indicator?

After the groups had formulated lists of indicators for the values assigned to them, they were asked to rank their indicators according to the following five properties of a good indicator:

- Relevant
- Understandable
- Measurable
- Feasible
- Predictable

Participants were asked to rank each indicator on a scale of 1-5, with 1 being not at all relevant, understandable, etc., and 5 being very relevant, understandable, etc. Participants were then asked to record whether or not the indicator should remain on the list.

The rankings indicate that, for the most part, stakeholders felt that the indicators they identified for their values were good ones. Of the total 99 indicators that the groups came up with, participants felt that only five should definitely be removed from the list, and they were unsure about two. Predictability of the indicators probably caused the most concern for the workshop participants. Concern about the feasibility and measurability of some indicators was also evidenced by the rankings. Below is a brief summary of how appropriate the participants thought the indicators were for each value. A complete summary of the rankings can be found in Appendix 2.

Ownership patterns

Indicators:

- Area:Perimeter
- Miles of Great Lakes shoreline
- Number of developed sites
- Miles of road/area of ownership
- Percent of public ownership in LSSF
- Average size (acres) and distribution of sizes

It was felt that all these indicators were good ones. Average rankings for the five properties for each of the indicators ranged from 3 to 5, with most rankings being between 4 and 5.

Institutional processes

Indicators:

- Existence of a forest plan
- Extent of linkage to other collaborative processes

- Joint interdivisional meetings and training sessions
- Existence of audit or assessment program
- Number of public contacts
- Timeliness of response to public requests
- Number of and participation in open houses and listening sessions

Over all, the average scores for these indicators ranged from 3 to 5, with most being between 4 and 5. All of these indicators were considered to be good ones, except *Number of public contacts*. Even though the average scores for the properties were high for this indicator, with predictability being the lowest at 3, the group decided that it should not remain on the list.

Recreation

Indicators:

- Presence of historic/archeological resource protection plan
- Number of wildlife viewing areas
- Number of historic sites
- Number of waterfalls
- Visual quality best management practices (BMPs)
- Income level of forest users
- Road density and distribution - some open, some closed
- Acres of managed old growth
- User satisfaction
- User days
- Number of miles of restored coastal systems
- Number of coastal restoration projects
- Separation of trail use
- Percentage of roadless areas
- Acres of "designated" solitude (primitive) areas
- On-going gap analysis
- Number of interpretive centers
- Miles of trail systems
- Distribution of recreational opportunities
- Water access - developed

All of these indicators were viewed as good ones, except that the group was unsure about *Separation of trail use*. Average rankings for the properties ranged from 2 to 5, although most of the rankings were 4s and 5s. The feasibility and predictability of *Income level of forest users* and the predictability of *Separation of trail use* were the properties that were ranked as 2.

Recreation generated more indicators than most values. Partly this is due to the broad nature of the value, and the potential for conflict. It was clear from discussion during the workshop that there is a need for more information about the nature of the recreational opportunities. This is linked to some of the questions that were raised about the numerous land uses on the Upper Peninsula. There is no question about the importance of the industrial users and their need for a large, healthy timber resource. The specific needs of the recreational (and tourism) interests were less clear, although many general values were cited. It would be useful to compile some basic information about the types of recreational users and their preferred locations so as to be able anticipate future forest management directions. In fact, this information would be an asset in the values mapping exercise, which is a basic requirement for the preparation of a forest management plan.

Multiple Use

Indicators:

Timber production

- Volume harvested by product and species
- Acres of type by size class
- Number of loggers employed

All three of these were considered good indicators. The average rankings for all properties were either 4 or 5 for each indicator.

Timber land

- Acres by site and type
- Volume/acre by species and type
- Legal and physical accessibility
- Acres by soil type

All four of these were considered good indicators. The average rankings for all properties were either 4 or 5, except the predictability of *Legal and physical accessibility*, which had an average ranking of 3.

Good road system

- Existence of a good road plan
- Miles of road by use class

- Maintenance expenditure on state land
- Road conditions

The group felt that these indicators should remain on the list, and most of the average rankings for the properties were 4 and 5. However, the feasibility and predictability of *Existence of good road plan* and the feasibility, predictability and measurability of *Road conditions* were scored as 3s or 3.5s.

Hunting, fishing, berry picking, wildflowers, mushrooms, wildlife

- Population density by species
- Harvest number by species
- User days by activity
- Population health by species

The group felt that these indicators should remain on the list; however, almost half of the average rankings were 3s. The measurability and feasibility of all four of the indicators were ranked as 3. The predictability of *Population density by species* was ranked as 3, and was ranked as 2 for the remaining indicators.

Camping at designated sites

- Number of campgrounds
- Number of campsites in campgrounds
- User days by campground and campsite

These three indicators were seen as very good. Except for the feasibility and predictability of *User days by campground and campsite*, which were ranked as 4.5 and 4, respectively, the rest of the properties were ranked as 5 for each indicator.

Off-site camping

- User days
- Number of camps
- Environmental impact of off-site camping

These indicators were seen as relevant and understandable, with rankings of either 4.5 or 5 for all three. However, measurability and feasibility were generally ranked as 3, and predictability was ranked as 2 for all three indicators. The group did not feel that *User days* should remain on the list.

Autumn colors

- User days (number of viewers)
- Acres of hardwood type
- Number of designated viewing areas
- Miles of designated viewing routes

Except for *User days*, these indicators were ranked between 4 and 5 for all properties. The measurability, feasibility, and predictability of *User days* was ranked as 3, and the group felt that it should not remain on the list.

Trail-related recreation

- Miles of legal trails by trail type and use
- Number of user days by trail type

The group felt that both these indicators should remain on the list. However, *Number of user days by trail type* scored low in measurability, feasibility and predictability (2.5, 2, and 2, respectively).

Designated target ranges

- Number of ranges
- Dispersal of ranges

These were seen as good indicators. The properties were ranked between 4 and 5.

Spiritual

Indicators:

Little development

- Proximity to dwellings and commercial structures

Natural Sounds/Quiet

- Absence of man-made sounds

Spiritual remoteness

- Road density

- Percentage of area in wilderness, natural area, ecological reserve

Aesthetics

- Number of viewing areas

Provides spiritual and cultural experience

- Presence of spiritually important wildlife and plant species

Stability of land use

- Amount of change of ownership

These were all seen as good indicators. Most of the properties were ranked as 4 or 5. The lowest score was 2.86 for the feasibility of the *Absence of man-made sounds*.

Social/Cultural

Indicators:

Sense of welcome

- Presence of positive signage/greetings
- Number/Presence of pamphlets

Handicap access opportunities

- Number of accessible sites

Place for nature and scientific study

- Number of interpretive/educational opportunities

Stability of land use

- Amount of change of ownership

These were all seen as good indicators. Most properties were ranked as 4 or 5. The lowest score was 3.57 for both the measurability of the *Number/Presence of pamphlets* and the predictability of the *Amount of change of ownership*.

Diversity of Jobs

Indicators:

- Direct timber-harvest jobs
- Recreational jobs
- Indirect service jobs
- Quality-of-life jobs
- Recreational-equipment jobs

Except for *Quality-of-life jobs*, these indicators were seen as good, scoring between 3 and 5. *Direct timber-harvest jobs* was seen as particularly good, scoring all 5s. The group was unsure as to whether or not *Quality-of-life jobs* should remain on the list. It scored 2 for measurability and feasibility and 1 for predictability.

Biodiversity

Indicators:

- Population of endangered/threatened/vulnerable species
- Area, percentage and representativeness of forest (including open areas) in protected areas
- Maintain full complement of native plant communities/ecosystems/ natural processes
- Road density by road class (two track vs. M28)
- Maintain full complement of native species at appropriate levels
- Percentage and extent of area by forest type and age class
- Habitat of endangered/threatened/vulnerable species

These were seen as good indicators. They scored between 4 and 5 in terms of being relevant and understandable. Feasibility and predictability were scored lower, ranging from 2.5 to 5.

These indicators have implications for the integration of services that is under way in the Michigan Department of Natural Resources (MDNR). It is probable that staff from the wildlife division will have a major interest in coordinating these indicators to be consistent with current programs.

Healthy Forest

Indicators:

- Water quality relative to "natural" levels
- Survival of existing trees/plants/animals
- Percentage and extent of area by forest type and age class
- Recruitment of native biota (trees, animals, other plants, etc.)

These were seen as very good indicators. The average scores were mainly 4.8 and 5. The lowest score was 3 for the predictability of *Water quality relative to "natural" levels*.

Water Resources

Indicators:

- Quality
- Area, percentage, status and type of water
- Area, percentage, status, and type of surround land/influence zone
- Aquatic and plant life

These indicators were seen as very good. They all scored 5 for being relevant and understandable and 4 for being measurable, feasible, and predictable.

Unique features

Indicators:

- Use
- Area, type and number (native plants, waterfalls, etc.)
- Degradation
- Access
- Acquisition

These indicators all scored between 3 and 5 and, except for *Access* and *Acquisition*, they were seen as good. Although *Access* and *Acquisition* scored well, the group decided that they should not remain on the list. They noted that, just because a feature is accessible, it does not mean it is unique.

5. Narrowing down the list of indicators

Workshop participants formulated a list of 99 indicators. In order to narrow down the list to a more manageable number, we combined similar topics under each value and developed about five sub-values for each value. In some cases, groups had already developed sub-values and we used them. We then assigned an appropriate indicator to each sub-value. Values and indicators come directly from the list developed at the workshop. Some of the indicators consolidate several indicators from the list provided at the workshop. Table 1 contains our suggested list of indicators for all of the sub-values. Some indicators may be applied to more than one sub-value, but duplicates do not appear in Table 1. Table 2 lists the indicators and shows to which of the 12 broad values the indicators are linked. Table 3 lists each value with its sub-values, and the corresponding indicator(s) for each sub-value. Since some indicators have been assigned to more than one sub-value, duplicate indicators appear in Table 3. A description of each indicator listed in Table 3 can be found in Table 1.

Table 1. Indicators selected at Workshop I. This list has been reduced from the original to minimize duplication. Some of the indicators incorporate several indicators from the list provided at the workshop.

Indicator	Description
Road density	Type (primary, secondary, tertiary) and length (miles) of road and characteristics of the area within 1 mile of the roads.
Ownership type and land use	Measures land ownership type (federal, state, corporate, individual, etc.), how the land is being used (productive, unproductive, recreation, etc.) and how the land is distributed.
Opening size	Measures the size of forest openings in acres. Openings can be categorized according to size (e.g., big openings: > 5 acres).
Existence of audit or assessment program	Determines whether or not an audit or assessment procedure is in place.
Integrated planning system	Determines whether or not a planning system is in place that takes into account values from the various parties interested in the forest.
Response to public requests	Measures adherence to a policy for responding to public requests in a timely fashion.
User days/activity	The number of days people spend in various activities in the forest (e.g., hunting, fishing, camping, learning, enjoying nature, etc.)
Miles of trail systems by land use designation	Measures the miles of trail systems and what the trails are used for (e.g., snowmobiling, cross-country skiing, hiking, etc.)
Size and distribution of natural areas	Measures size (acres), number, distribution and interconnectedness of natural areas, corridors, etc.

[cont'd]

Table 1. Indicators selected at Workshop I. This list has been reduced from the original to minimize duplication. Some of the indicators incorporate several indicators from the list provided at the workshop.

Indicator	Description
Area of forest type by age class	Information from the Operations Inventory manual. Small, uncommon forest types should be included.
Number of educational and recreational resources	A count of the number of viewing areas, interpretive centers, areas and trails for both education and recreation.
Number of miles of restored coastal systems	Records number of restored coastal systems as a measure of nature appreciation.
Number of historic sites	Measures the number of historic sites that have been identified and conserved.
Presence of a historic/archeological resource plan	The degree to which historic and archeological sites are addressed in the planning system.
Diversity of recreational opportunities	The availability of different ways for people to use the forest provides a measure of the various ways people can access the forest.
Volume/acre by species, type and age class	Growth and yield data.
Area harvested	Records the area forested as a measure of timber production.
Volume/acre/forest type	Growth and yield data.
Change in ownership	Tracks change in ownership type (federal, state, corporate, individual, etc.), land use (productive, unproductive, recreation, etc.) and land distribution.

[cont'd]

Table 1. Indicators selected at Workshop I. This list has been reduced from the original to minimize duplication. Some of the indicators incorporate several indicators from the list provided at the workshop.

Indicator	Description
Presence of information resources	Monitors the presence of signage, greetings, pamphlets, etc., that help to enhance the public's enjoyment of the forest.
Jobs/economic activity	A socio-economic analysis for which a computer model can be used.
Volume of wood/product	Growth and yield data.
Wood product summary	Annual statement of wood products.
Area, percentage and representativeness of forest types in protected areas	Protected forest areas (including uncommon types) can be used as ecological benchmarks to compare undisturbed areas with areas managed for other purposes (including open areas).
Forest regeneration by forest type and silvicultural prescription	Measures forest regeneration on the basis of silvicultural guidelines and by forest type.
Population levels, habitat and changes over time of selected species guilds	A group of species identified for each forest age class can be used to monitor species diversity and health of an ecosystem. Species can be chosen on the basis of various factors (e.g., breeding and feeding requirements, habitat requirements, etc.)
Water quality	Measures oxygen content, sedimentation, coliform count, etc., of water bodies and compares them with standard levels.
Forest health and integrity of natural cycles	Measures the health of the forest (e.g. amount of water and air pollution) and the integrity of natural cycles.

Table 2. Indicators selected at Workshop I, and the values with which they are associated.

Indicator	Ownership Patterns	Institutional Processes	Recreation	Multiple Use	Spiritual	Social/ Cultural	Diversity of Jobs	Biodiversity	Healthy Forests	Global Cycles	Water Resources	Unique Features
Road density	✓											
Ownership type and land use	✓										✓	
Opening size	✓		✓									
Existence of audit or assessment program		✓										
Integrated planning system		✓	✓	✓	✓							
Response to public requests		✓										
User days/activity			✓	✓	✓							
Miles of trail systems by land-use designation			✓	✓		✓				✓	✓	
Size and distribution of natural areas			✓		✓					✓	✓	✓
Area of forest type by age class			✓	✓				✓	✓			✓
Number of educational and recreational resources			✓	✓	✓	✓						✓
Number of miles of restored coastal systems			✓									
Number of historic sites			✓			✓						✓
Presence of a historic/ archeological resource plan			✓			✓						

[cont'd]

Table 2. Indicators selected at Workshop I, and the values with which they are associated.

Indicator	Ownership Patterns	Institutional Processes	Recreation	Multiple Use	Spiritual	Social/ Cultural	Diversity of Jobs	Biodiversity	Healthy Forests	Global Cycles	Water Resources	Unique Features
Diversity of recreational opportunities			✓			✓						
Volume/acre by species, type and age class				✓			✓					
Area harvested				✓								
Volume/acre/forest type				✓			✓					
Change in ownership					✓							
Presence of information resources					✓	✓						
Jobs/ economic activity							✓					
Volume of wood/product							✓					
Wood product summary							✓					
Area, percentage and representativeness of forest types in protected areas								✓	✓			
Forest regeneration by forest type and silvicultural prescription								✓				
Population levels, habitat and changes over time of selected species guilds								✓	✓			✓
Water quality									✓			
Forest health and integrity of natural cycles									✓	✓	✓	✓

Table 3. Values and associated indicators identified for the LSSF. Values and indicators come directly from Workshop I. Some editing has been done for clarity and consistency.

Value*	Sub-values **	Indicator(s)***
Ownership Patterns	Accessibility	Road density
	Ownership patterns	Ownership type and land use
	Unfragmented forest	Ownership type and land use
	Great Lakes shoreline	Ownership type and land use
	Forest openings	Opening size
Institutional Processes	Quality management	Existence of audit or assessment program
	Spirit of cooperation	Integrated planning system
	Integrated management	Integrated planning system
	Customer service	Response to public requests
	Road/trail distribution	Integrated planning system
	Collaborative process	Integrated planning system
Recreation	Consumptive recreation	User days/activity
	Trails (hiking, skiing, etc.)	Miles of trail systems by land-use designation
	Nature appreciation	Size and distribution of natural areas
		Integrated planning system
		Miles of trail systems by land-use designation
		Area of forest type by age class
		User days/activity
		Number of educational and recreational resources
		Number of miles of restored coastal systems
	Camping	User days/activity
	Education	User days/activity
		Number of educational and recreational resources
	History	Number of historic sites
		Presence of a historic/archeological resource plan
	Diversity of accessibility	Miles of trail systems by land-use designation
		Diversity of recreational opportunities
	Walkable forests	Opening size
Multiple Use	Trail recreation	Miles of trail systems by land-use designation
	Quality camping	User days/activity
	Low-impact camping	
	Autumn colors	Number of educational and recreational resources
	Target ranges	User days/activity
	Timber production	Area of forest type by age class

[cont'd]

Table 3. Values and associated indicators identified for the LSSF. Values and indicators come directly from Workshop I. Some editing has been done for clarity and consistency.

Value*	Sub-values **	Indicator(s)***
		Number of educational and recreational resources
		Volume/acre by species, type and age class
		Area harvested
		Volume/acre/forest type
	Hunting, fishing, berry picking	User days/activity
	Quality of road system	Integrated planning system
		Miles of trail systems by land-use designation
Spiritual	Remoteness	Size and distribution of natural areas
	Aesthetics	User days/activity
		Number of educational and recreational resources
	Natural sounds/Quiet	Size and distribution of natural areas
	Stability of land use	Integrated planning system
		Change in ownership
	Undeveloped forest	Size and distribution of natural areas
	Provides spiritual and cultural experience	Number of educational and recreational resources
		Presence of information resources
Social/Cultural	Sense of welcome	Presence of information resources
	Handicap access opportunities	Diversity of recreational opportunities
	Indirect service jobs	
	Stability of land use	Miles of trail systems by land-use designation
	Place for nature and scientific study	Number of educational and recreational resources
		Presence of information resources
	Archeology	Number of historic sites
		Presence of a historic/archeological resource plan
Diversity of Jobs	Timber harvest	Volume/acre by species, type and age class
		Volume/acre/forest type
		Jobs/economic activity
		Volume of wood/product
	A good place to live	Jobs/economic activity
	Non-timber economic benefits	Jobs/economic activity
	Forest products	Wood product summary
Biodiversity	Landscape diversity	Area of forest type by age class
		Area, percentage and representativeness of forest types in protected areas
		Forest regeneration by forest type and silvicultural prescription

Table 3. Values and associated indicators identified for the LSSF. Values and indicators come directly from Workshop I. Some editing has been done for clarity and consistency.

Value*	Sub-values **	Indicator(s)***
	Featured species and rare, threatened and endangered (RTE) species	Area of forest type by age class Population levels, habitat and changes over time of selected species guilds
	Plant species	Area of forest type by age class
	Areas of natural and scientific interest	Area of forest type by age class Area, percentage and representativeness of forest types in protected areas
	Habitat	Area of forest type by age class Population levels, habitat and changes over time of selected species guilds
Healthy Forests	Appropriate populations of wildlife species	Population levels, habitat and changes over time of selected species guilds
	Good water quality	Water quality
	Good soil quality	Forest health and integrity of natural cycles
	Variable age classes	Area of forest type by age class
	Sustainability	Area, percentage and representativeness of forest types in protected areas Forest health and integrity of natural cycles
Global Cycles	Natural cycles	Forest health and integrity of natural cycles
	Little development	Size and distribution of natural areas
	Natural sounds	Miles of trail systems by land-use designation
	Clean air	Forest health and integrity of natural cycles
	Water production	Forest health and integrity of natural cycles
Water Resources	Great Lakes shoreline	Ownership type and land use Size and distribution of natural areas
	Clean water	Forest health and integrity of natural cycles
	Lots of water resources	Size and distribution of natural areas
	Undisturbed wetlands	Size and distribution of natural areas
Unique Features	Wetlands	Size and distribution of natural areas
	Special features	Number of educational and recreational resources
	Historical features	Number of historic sites
	Non-forest types	Size and distribution of natural areas
	Unique species	Number of educational and recreational resources Population levels, habitat and changes over time of selected species guilds Forest health and integrity of natural cycles

[cont'd]

Table 3. Values and associated indicators identified for the LSSF. Values and indicators come directly from Workshop I. Some editing has been done for clarity and consistency.

Value*	Sub-values **	Indicator(s)***
	Biophysical features	Area of forest type by age class Forest health and integrity of natural cycles

* Values - these value categories were chosen by the participants at Workshop I.

** Sub-values are more specific descriptions of the value categories. Sub-values may have several indicators associated with them.

*** Indicators repeat for sub-values that share the same indicator.

6. How do the LSSF values compare with CSA/GLFA values?

Although the list of values developed by the external and internal stakeholders of the LSSF is longer, there are many similarities between it and the lists that have been developed by CSA and GLFA. LSSF stakeholders, CSA and GLFA all value the conservation of biological diversity. Concepts present in the LSSF value *Healthy Forests* are similar to those in CSA's value *Maintenance and Enhancement of Forest Ecosystem Condition and Productivity* (e.g., health, vitality, and rates of biological production) and GLFA's value *Maintenance of Biological Resources*. *Institutional Processes*, an LSSF value, is similar to CSA's value *Accepting Society's Responsibility for Sustainable Development* and GLFA's value *Society's Framework for SFM,* and deals with the institutional frameworks used to maintain sustainable forest management.

LSSF stakeholders, CSA and GLFA all address the importance of soil and water quality. CSA places soil and water in one value, *Conservation of Soil and Water Resources*, as does GLFA, *Maintenance of Soil, Water and Air Quality*. LSSF stakeholders included both soil and water in *Healthy Forests*, but also created a separate value, *Water Resources*. GLFA also addresses the influence of forests on global cycles in its *Maintenance of Soil, Water and Air Quality* value. CSA addresses this issue in its *Forest Ecosystem Contributions to Global Ecological Cycles* value. Although the LSSF stakeholders felt that global cycles were beyond their scope in terms of formulating indicators, they did identify them as a value.

CSA identifies *Multiple Benefits to Society* as a value. This value incorporates commercial wood products, commercial and non-market goods and services, direct and indirect forest industry jobs, tourism, recreation, etc. The LSSF list of values captures these items, but divides them into separate values (i.e., *Recreation*, *Multiple Use*, *Spiritual*, *Social/Cultural* and *Diversity of jobs*). These values are also similar to GLFA's value *Maintenance of Community and Cultural Values*. The LSSF stakeholders' value *Diversity of Jobs* is also closely related to the GLFA value *Provision of Multiple Economic Benefits*.

Two LSSF values that are different from the CSA and GLFA values are *Ownership Patterns* and *Unique Features*. Since the items captured in these values are quite specific to the LSSF (e.g., Great Lakes shoreline), it makes sense that they are different from the broader CSA values.

7. How do the LSSF indicators compare with the CSA/GLFA indicators?

Although, over all, the indicators developed by the LSSF stakeholders do not differ that much from those identified by CSA or GLFA, there are some indicators that are unique to the different groups. As well, there is variation among the groups in terms of which indicators are emphasized.

The indicators for biodiversity were similar among the groups. Both CSA and LSSF stakeholders address forest types in protected areas and forest type by age class. All three groups address rare, threatened and endangered species. LSSF stakeholders and GLFA have similar indicators addressing landscape diversity and populations levels of selected species. Both LSSF stakeholders and GLFA have indicators related to habitat of selected species, but GLFA includes indicators on habitat enhancement. LSSF stakeholders did not include indicators comparable with the CSA and GLFA indicators related to genetic diversity.

GLFA has indicators similar to the LSSF indicators that relate to *Institutional Processes* (e.g., *Integrated resource management plan* and *Existence of an audit or assessment program*). In terms of institutional processes, GLFA has more indicators related to policy and laws than the LSSF stakeholders identified. Both CSA and GLFA have more indicators addressing public participation in the planning process. This may be a result of the public participation portion of Workshop I – participants may have felt that indicators would be developed separately for that process. CSA and GLFA also place much more emphasis on the role of First Nations in institutional processes. In the course of a CSA and FSC evaluation, the status and concerns of the native interest in forest management will be documented separately as part of the development of the plan.

In terms of forest health, all three groups have similar indicators for water and soil quality. However, CSA and GLFA both have more detailed indicators addressing these issues (e.g., *Area managed for water and soil conservation*). Both CSA and LSSF stakeholders identified forest types in protected areas as one way of measuring the health of the forest. Although forest disturbances are addressed in the LSSF indicator *Forest health and integrity*, both CSA and GLFA emphasize monitoring disturbance as a measure of ecosystem condition.

LSSF stakeholders felt that developing indicators for global cycles was beyond their scope. We chose indicators for global cycles that are similar to

those of the CSA, although both CSA and GLFA have more detailed indicators relating to global cycles. For example, CSA has indicators that address policy issues related to global cycles.

Perhaps the biggest difference between the LSSF and the CSA indicators is in those relating to multiple benefits of the forest. LSSF stakeholders have many more indicators relating to recreation (e.g. *User days/activity*) and the spiritual, cultural and social benefits of the forest. GLFA has indicators similar to the LSSF indicators that relate to multiple benefits. Unlike the LSSF indicators, the GLFA indicators address how the benefits relate to First Nations issues. All three groups have similar indicators addressing economic benefits, both timber and non-timber. For example, GLFA and LSSF both have *Volume of wood/product* as an indicator. CSA and GLFA also have economic indicators that address the contribution that forests make on a national scale, whereas the LSSF indicators are more locally focused.

Although *Ownership Patterns* as a value is unique to LSSF, GLFA has similar ownership pattern indicators. For example, GLFA has an indicator *Average size of private forest holding*.

In summary, although there are many similarities among the LSSF, CSA, and GLFA indicators, there are a couple of key points that set the LSSF indicators apart from the other two. The LSSF indicators emphasize the recreational, spiritual, cultural and social benefits of the forest. They place less emphasis on First Nations issues and focus on local as opposed to national or global issues.

8. The next steps

The next step in this process of developing values and indicators will be to sort the defined indicators into two categories: those that can be implemented immediately and those that need to be developed further before they can be used. Both categories of indicators then need to be integrated into the forest management planning process. Ultimately, the forest management planning process will be challenged by assessing evidence of the following components:

1) Commitment
2) Roles and responsibilities
3) Continual improvement
4) Public participation.

Appendix 1. Values identified by each group.

Group 1

Quality management
Customer service
Cohesive integrated management
Appropriate road/trail distribution
Recreation/education
Gathering
Learning place
Quality and diverse fishing
Hunting opportunities
Ski trails
Camping
Remote
Deep snow belt
Aesthetically pleasing
Multitude of wood and wood uses
Neotropical bird migration and breeding
Intensive timber management
High timber volume
Quality timber management
Unique plant communities
Unique ecology
Island resources
Great Lakes shoreline
Big hemlock
Large and naturally functioning
Extensive wetlands
Unique wildlife
Historical features
Diversity
Inland lakes
Intact hydrology
Job-supporting role

Group 2

Non-motorized areas
Large tracts of undeveloped land
Solitude and quiet
Physical challenges
Perception of wilderness
Road density
Old growth
Good fishing
Trail systems
Wildlife viewing
Good grouse and deer hunting
Waterfall viewing
Walkable forest clearcuts
Small scattered sawmills throughout
Maintaining renewable resources
Forest openings for homesteads and wildlife
Cover type habitat
People who work there
Porcupines
Fewer than 5 deer per sq. mile
More prescribed burn
White pine restoration
Renewable
Environmental quality
Protection efforts
Stream sedimentation
Clean water
Some 18-in.-diameter trees
Uneven-aged stands
Abundant decomposition
Clean forest
Lake (Great or inland) coastline aesthetics

Diverse forest types, wildlife habitat, recreational opportunities, unique plants
Lowland cedar, tamarack, spruce forest
Fewer beaver

Group 3

Good maps exist
Big openings
Large expanses of public land
Lack of development
Snowmobiling
Cross-country skiing
Quality camping
Places to take dogs
Hunting and fishing
Autumn color
Berry and mushroom picking
Trilliums and wildflowers
Driving in forest
4X4 opportunities
Target range
Bicycling
Timber production
Good road system
Snowshoeing
Four season use
Dog sledding
Historic lore
Attitudes of local people
Accessible land
Remote solitude
Knowledge that features are well managed (fire, law, wildlife)
Educational opportunities
Diverse species
Wildlife
Moose
Wolves
Sandhill cranes
Spruce grouse
Ravens
Eagles
Loons
Whiskey jays
Natural white and red pine
Cedar
Hemlock
Yellow birch
Northern hardwoods
Lots of water resources
Rivers
Great Lakes shoreline quality
Clean water
Wetlands
Whitefish point
Dunes
Karst
Fens
Waterfalls
Tahquamenon Falls

Group 4

Large areas of unfragmented forest
Natural areas
Corridors
Very large roadless areas
Lots of snow
Forests will be there in the future
Fewer people than down state
Fall and spring colors

Large undisturbed wetlands
Clear, clean creeks, streams, rivers
Rustic camping
Cross-country ski trails
Hiking trails through forest
Free camping
Hunting and fishing
Diversity of commodities
Blueberries/mushrooms
A place for nature and scientific study
High-quality northern hardwood
Productive timberland
Large pine plantations
Adequate habitat for large mammals
Provides a spiritual experience
Quiet
Freedom to walk through lots of land
Vistas/viewing areas
Seasons
A place to observe ecological relationships
Unique, threatened and endangered species
Opportunities for handicapped to experience the outdoors
Role in water production
Little development
Smell of the pine forest
I'm welcome on this forest
A place where it gets dark at night
Stability of land use
Sound of big tree being cut
Roles of forests in natural cycles
Archeology
Trees
Diversity of jobs
Makes area a good place to live
A place to make a living
Natural sounds
Beaches - Great Lakes shoreline
Wolves
Migratory birds
Trees of diverse ages
Diversity of species
Spiritual experience in uncrowded landscape
Diversity of opportunities for people to play
Unique land forms/ecosystems - Alvar Strandmar Bog

Group 5

Accessibility
Ownership of Great Lakes shoreline
Continuity and size of public land
Undisturbed wetlands
Natural sounds
Recreational camping
Hunting and fishing
Water resources: amount and quality
Motorized recreational opportunities
Non-motorized recreational opportunities
A working forest with multiple uses - recreation and timber harvest
Solitude/serenity
Large blocks of pines
Lack of obvious human activity
Economic benefits
Diverse ecosystems
Nature photography
Sightseeing opportunities
Wildlife viewing
Historic sites
Berry and mushroom picking
Diversity of timber resource
Excellent balance among all user groups

Group 6

Ownership patterns and large blocks
Fall colors
Skiing
Snowshoeing
Snowmobiling
ORVs
Trapping
Fishing
Hunting
Hiking
Camping
Canoeing
Wildflowers
Birds
Berry picking
Gray jay
Boreal chickadee
Wetlands, swamps, ponds, streams
Relative absence of deer in Northern forest (N. of M28) is good
Peatlands (bogs, fens, patterned peatlands)
Different forest types and different successional stages in different size patches
Old hemlock
White pine
Migratory birds
Orchids
Wolves
Fishers
Deer
Waterfowl
Bear
Red crossbill
Spruce grouse
"Everything"
Groves of big trees
Regenerating forest
Alvars
Moose
Renewable, resilient, sustainable
Relative abundance of deer
Too many deer in south - poor maple, cedar regeneration, etc.
A diversity of cover types and age classes

Group 7

Diverse recreational opportunities
Beauty
Diversity of accessibility
Opportunities for solitude
Educational opportunities
Social benefits
Forest products
Subsistence uses
Protection of rare communities and natural features
Opportunity to integrate other collaborative processes into plan, e.g., 7th For. Cong.
Clean forest
Solitude
Renewable
Stable soils
Good water quality
Ecosystem function
Clean air
Produce more wood
Some areas left alone to function as natural processes
Wildlife species associated with northern habitat
Wood products for people

Appendix 2. Summary of the average rankings for the relevancy, understandability, measurability, feasibility, and predictability of each indicator developed for each value.

Note: Averages do not include blank or "unsure" responses. Footnotes indicate where there was a blank or "unsure".

Value: Ownership patterns

Indicator	Relevant	Understandable	Measurable	Feasible	Predictable	Remain on list? (yes/no)
1. Area:Perimeter ratio	4.25	4	4.25	4.5	4[1]	yes
2. Miles of Great Lakes shoreline	4.75	5	5	4.5	4.75	yes
3. Number of developed sites (campgrounds, water access, etc.)	4.3[2]	3	4.5	3.75	4[2]	yes
4. Miles of road/area of ownership	4.5	4.5	4.5	4.25	4.5	yes
5. Percentage of public ownership in LSSF	4.5	4.75	4.25	5	4	yes
6. Average size (acres) and distribution of sizes	4.67[1]	4[2]	4	3.5	3.5	yes

[cont'd]

[1] One "unsure"
[2] One blank

Value: Institutional processes

Indicator	Relevant	Understandable	Measurable	Feasible	Predictable	Remain on list? (yes/no)
1. Existence of a forest plan	5	5	4.5	4.25	3.25	yes
2. Extent of linkage to other collaborative processes	4.25	3.5	3.25	3.25	3.5	yes
3. Joint interdivisional meetings and training sessions	4.5	4.75	4.75	4.5	4.33[1]	yes
4. Existence of audit or assessment program	5	4.75	4.75	3.25	4.67[1]	yes
5. Number of public contacts	4	4.75	4	4	3	no
6. Timeliness of response to public requests	4.5	4.75	4	3.5	3.25	yes
7. Number of and participation in open houses and listening sessions	4.5	5	4.75	4.5	3.5	yes

Value: Recreation

Indicator	Relevant	Understandable	Measurable	Feasible	Predictable	Remain on list? (yes/no)
1. Presence of historic/archeological resource protection plan	3	4	5	5	3	yes
2. Number of wildlife viewing areas	4	5	5	5	4	yes
3. Number of historic sites	4	5	5	5	4	yes
4. Number of waterfalls	3	5	5	5	3	yes
5. Visual quality best management practices (BMPs)	4	4	3	4	3	yes
6. Income level of forest users	4	4	3	2	2	yes
7. Road density and distribution - some open, some closed	5	4	4	4	3	yes

[cont'd]

Value: Recreation						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
8. Acres of managed old growth	4	3	4	4	3	yes
9. User satisfaction	4	4	3	3	3	yes
10. User days	4	4	4	4	4	yes
11. Number of miles of restored coastal systems	3	3	4	3	3	yes
12. Number of coastal restoration projects	3	3	5	3	3	yes
13. Separation of trail use	4	3	4	3	2	yes?
14. Percentage of roadless areas	4	3	4	4	3	yes
15. Acres of "designated" solitude (primitive) areas	4	4	4	4	3	yes
16. On-going gap analysis	3	3	3	3	3	yes
17. Number of interpretive centers	4	4	5	5	3	yes
18. Miles of trail systems	4	4	5	5	4	yes
19. Distribution of recreational opportunities	4	4	4	4	4	yes
20. Water access - developed	4	4	5	5	4	yes

[cont'd]

Value: Multiple Use (Timber production)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Volume harvested by product and species	5	4	5	5	4	yes
2. Acres of type by size class	5	4	5	5	5	yes
3. Number of loggers employed	4	4	4	4	4	yes

Value: Multiple Use (Timber land)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
4. Acres by site and type	5	5	5	5	5	yes
5. Volume/acre by species and type	5	5	5	4	5	yes
6. Legal and physical accessibility	5	4	4	4	3	yes
7. Acres by soil type	5	4	4	4	4	yes

Value: Multiple Use (Good road system)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
8. Existence of good road plan	5	4	4	3	3	yes
9. Miles of road by use class	5	4	4	4	4	yes
10. Maintenance expenditure on state land	4	4	4	4	4	yes
11. Road conditions	5	4	3.5	3	3.5	yes

[cont'd]

Value: Multiple Use (Hunting, fishing, berry picking, wildflowers, mushrooms, wildlife)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
12. Population density by species	5	4	3	3	3	yes
13. Harvest number by species	5	4	3	3	2	yes
14. User days by activity	5	4.5	3	3	2	yes
15. Population health by species	5	4	3	3	2	yes

Value: Multiple Use (Camping at designated site)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
16. Number of campgrounds	5	5	5	5	5	yes
17. Number of campsites in campgrounds	5	5	5	5	5	yes
18. User days by campground and campsite	5	5	5	4.5	4	yes

Value: Multiple Use (Off-site camping)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
19. User days	5	5	3	2	2	no
20. Number of camps	5	5	3	3	2	yes
21. Environmental impact of off-site camping	5	4.5	3	3	2	yes

[cont'd]

Value: Multiple Use (Autumn colors)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
22. User days (number of viewers)	5	4	3	3	3	no
23. Acres of hardwood type	5	5	5	5	5	yes
24. Number of designated viewing areas	4	4	4.5	4	4.5	yes
25. Miles of designated viewing routes	4	4	5	5	4	yes

Value: Multiple Use (Trail related recreation)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
26. Miles of legal trails by trail type and use	5	4	4	4	4	yes
27. Number of user days by trail type	5	3.5	2.5	2	2	yes

Value: Multiple Use (Designated target ranges)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
28. Number of ranges	5	5	4	4	4	yes
29. Dispersal of ranges	4	5	5	4	4	yes

[cont'd]

Value: Spiritual (Little Development)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Proximity to dwellings and commercial structures	4.29	4.57	4.57	3.86	3.57	yes

Value: Spiritual (Natural Sounds/Quiet)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
2. Absence of man-made sounds	4.57	3.71	4	2.86	3.29	yes

Value: Spiritual Remoteness						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
3. Road density	4.86	4.71	4.86	4.29	4.43	yes
4. Percentage of area in wilderness, natural area, ecological reserve	4.57	4.86	5	4.57	4.57	yes

Value: Spiritual (Aesthetics)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
5. Number of viewing areas	4.29	4.86	4.71	4.29	4.14	yes

Value: Spiritual (Provides spiritual and cultural experience)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
6. Presence of spiritually important wildlife and plant species	4.14	3.86	3.29	2.86	3	yes

[cont'd]

Value: Spiritual (Stability of land use)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
7. Amount of change of ownership	3.86	4	4.71	3.57	3.29	yes

Value: Social/Cultural (Sense of welcome)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Presence of positive signage/ greetings	3.85	4.29	4	3.85	4.14	yes
2. Number/Presence of pamphlets	4	4	3.57	3.71	4.57	yes

Value: Social/Cultural (Handicap access opportunities)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
3. Number of accessible sites	4.29	4.86	5	4.14	4.57	yes

Value: Social/Cultural (Place for nature and scientific study)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
4. Number of interpretive/educational opportunities	4.29	4.71	4.71	4.14	4.29	yes

[cont'd]

Value: Social/Cultural (Stability of land use)						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
5. Amount of change of ownership	4.29	4.29	4.43	3.86	3.57	yes

Value: Diversity of jobs						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Direct timber harvest jobs	5	5	5	5	5	yes
2. Recreational jobs	5	4.75	3	4.25	4.25	yes
3. Indirect service jobs	5	4.25	3	3	3	yes
4. Quality-of-life jobs	5	3	2	2	1	unsure
5. Recreational equipment jobs	5	5	4	4	4	yes

[cont'd]

Value: Biodiversity

Indicator	Relevant	Understandable	Measurable	Feasible	Predictable	Remain on list? (yes/no)
1. Population of endangered/ threatened/vulnerable species	5	5	4.8	3.4	3	yes
2. Area, percentage, and representativeness of forest (including open areas) in protected areas	5	5	5	5	4.6	yes
3. Maintain full complement of native plant communities/ ecosystems/ natural processes	5	4.8	3.8	3.2	4.6	yes
4. Road density by road class (two track vs. M28)	4	4.4	5	5	4.6	yes
5. Maintain full complement of native species at appropriate levels	5	5	4	2.8	3.4	yes
6. Percentage and extent of area by forest type and age class	5	5	5	4.6	4.8	yes
7. Habitat of endangered/threatened/ vulnerable species	5	5	4.6	3.6	4	yes

Value: Healthy Forest

Indicator	Relevant	Understandable	Measurable	Feasible	Predictable	Remain on list? (yes/no)
1. Water quality relative to "natural" levels	4	4.2	5	5	3	yes
2. Survival of existing trees/plants/ animals	5	5	5	4.8	5	yes
3. Percentage and extent of area by forest type and age class	5	5	5	4.8	4.8	yes
4. Recruitment of native biota (trees, animals, other plants, etc.)	5	5	5	4.8	4.8	yes

[cont'd]

Value: Water Resources						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Quality	5	5	4	4	4	yes
2. Area, percentage , status and type of water	5	5	4	4	4	yes
3. Area, percentage, status and type of surrounding land/influence zone	5	5	4	4	4	yes
4. Aquatic and plant life	5	5	4	4	4	yes

Value: Unique Features						
Indicator	**Relevant**	**Understandable**	**Measurable**	**Feasible**	**Predictable**	**Remain on list? (yes/no)**
1. Use	4	4	3	3	4	yes
2. Area, type and number (native plants, waterfalls, etc.)	4	5	5	4	4	yes
3. Degradation	5	4	4	3	4	yes
4. Access	4	4	4	4	4	no
5. Acquisition	3	3	4	3	3	no

Appendix 3. Additional comments from workshop participants

- It's not clear that this is strictly an LSSF "project". Several references are made to the Eastern U.P. "Forest".

- The role of the "certification" group(s) needs to be clearly stated. Why isn't the MDNR willing to state clearly its intentions concerning certification? Is there a directive from Lansing to "certify" state forest land?

- Concern was expressed that not all the "stakeholders" were present at the workshop. How will their input be incorporated? What is the probability that someone else can step in and "deep-six" this effort?

- How and when will we debate/discuss the technical merit of the indicators? What expertise will the MDNR draw from to determine the validity of some indicators?

- There was no mention or coverage of the quality of timber produced by LSSF.

- The purpose of the workshop and how it relates to historical planning effort and accomplishments was well explained.

- We needed a more comprehensive introduction at the start of the session.

- What was the purpose of the meeting?

- What is the Forest Stewardship Council? Is it recognized nationally? Internationally? By the United Nations?

- What are the Sustainable Forest Management Standards and why were these set of standards picked?

- Where does funding from Great Lakes Environmental Protection Fund (GLEPF) come from?

- Good format; met many people; mentally a slow, cumbersome process made easier by your wit.

- Stakeholders need to have some accountability.

- Be careful: I can see where we can be overloaded with process issues. Our time is limited.

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Project Partners:

Michigan Department of Natural Resources
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Reports generated by this project include:

Project Summary: The Lake Superior State Forest Sustainable Forest Management Pilot Project

An Assessment of the Michigan Department of Natural Resources' Commitment to Sustainable Forest Management

The Lake Superior State Forest: A Description

Michigan Department of Natural Resources Operations Inventory: Survey Results

Roles and Responsibilities for Forest Management Planning in the Lake Superior State Forest

Public Participation in Forest Management Planning in the Lake Superior State Forest: Finding the Right Pathway

Establishing Criteria and Indicators for the Lake Superior State Forest

Workshop I Summary: Values and Indicators of the Lake Superior State Forest

Workshop II Summary: Establishing Targets, Practices and Responsibilities for the Indicators of the Lake Superior State Forest

Modeling Forest Management on the Lake Superior State Forest

Wildlife Habitat Projections for 15 Species in the Lake Superior State Forest

Risk Assessment of Forest Management for the Lake Superior State Forest

A Forest Management Planning Guide for the Lake Superior State Forest

Further information on this report or any of the reports listed may be obtained from:

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